

# ***618-10 & 11 Burial Grounds Remedial Design Workshop June 9 – 12, 2003***

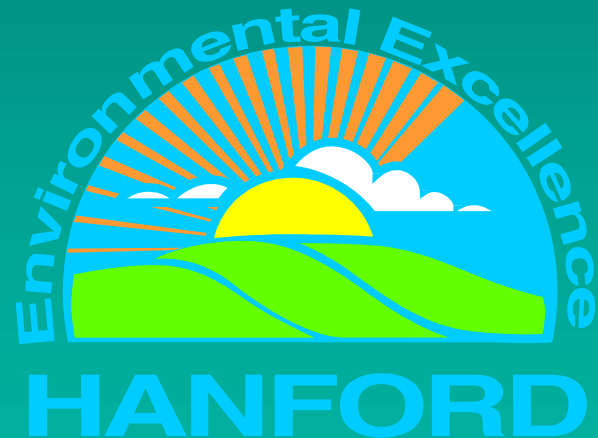
*Presented by:*

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*And*

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## Point of View

- Regulators and stakeholders have a high level of interest in the planning and priority
- One of the ten funding priorities developed at budget public review meetings and submitted to HQ states:  
“These burial grounds, with waste so dangerous it must be handled remotely, are next to the Columbia River. Funding to develop the technology necessary to clean them up must be a priority.”
- The DOE is developing a strategy for assessment and remediation of the 618-10 & 11 burial grounds. Workshop results will strongly influence this strategy.

## Point of View (continued)

- There are major regulatory, technical, logistical and resource issues to resolve.
- The DOE will be seeking Regulator and Stakeholder input on a viable strategy.

# Drivers For Remediation

- 1987 Final EIS, Disposal of Hanford Defense High Level TRU and Tank Waste (DOE/EIS-0113) and 1988 NEPA ROD (53 FR 12449) specified excavation, removal, and processing of waste from 618-11
- April 2001 300-FF-2 Operable Unit ROD specified complete Removal, Treatment, and Disposal (RTD) of waste from both 618-10 and 618-11 burial grounds
- Known tritium groundwater contaminant detected (at 1.6 million pCi/L) in January of 1999 at 618-11 down-gradient well and in August of 2000, the same well had a tritium spike of 8.4 million pCi/L (or 400 times the maximum contaminant level [MCL] established for drinking water). Elevated levels of nitrate were also detected in the same down-gradient well (10 X the MCL). Tritium plume indicates a potential pathway for future contaminants to migrate.

# Agenda For Presentation

- Status
- Milestones/Schedule
- DOE's recommendation for a path forward
- Background Detail
- Summary of issues that require resolution
- Possible Field Activities or Early Remedial Actions

# Status

- Work has been completed or planned for the following:
  - FY 01
    - Engineering Study
    - Records Search and Characterization Analysis
    - Technology Baseline Gap Analysis
    - Preliminary Hazards Classification
  - FY 02
    - Technology Baseline Update
    - Regulatory Evaluation
    - Preliminary cost and schedule estimate
    - 300 Area Remedial Design Report/Remedial Action Work Plan (RDR/RAWP) issued as Rev. 0

# Status (continued)

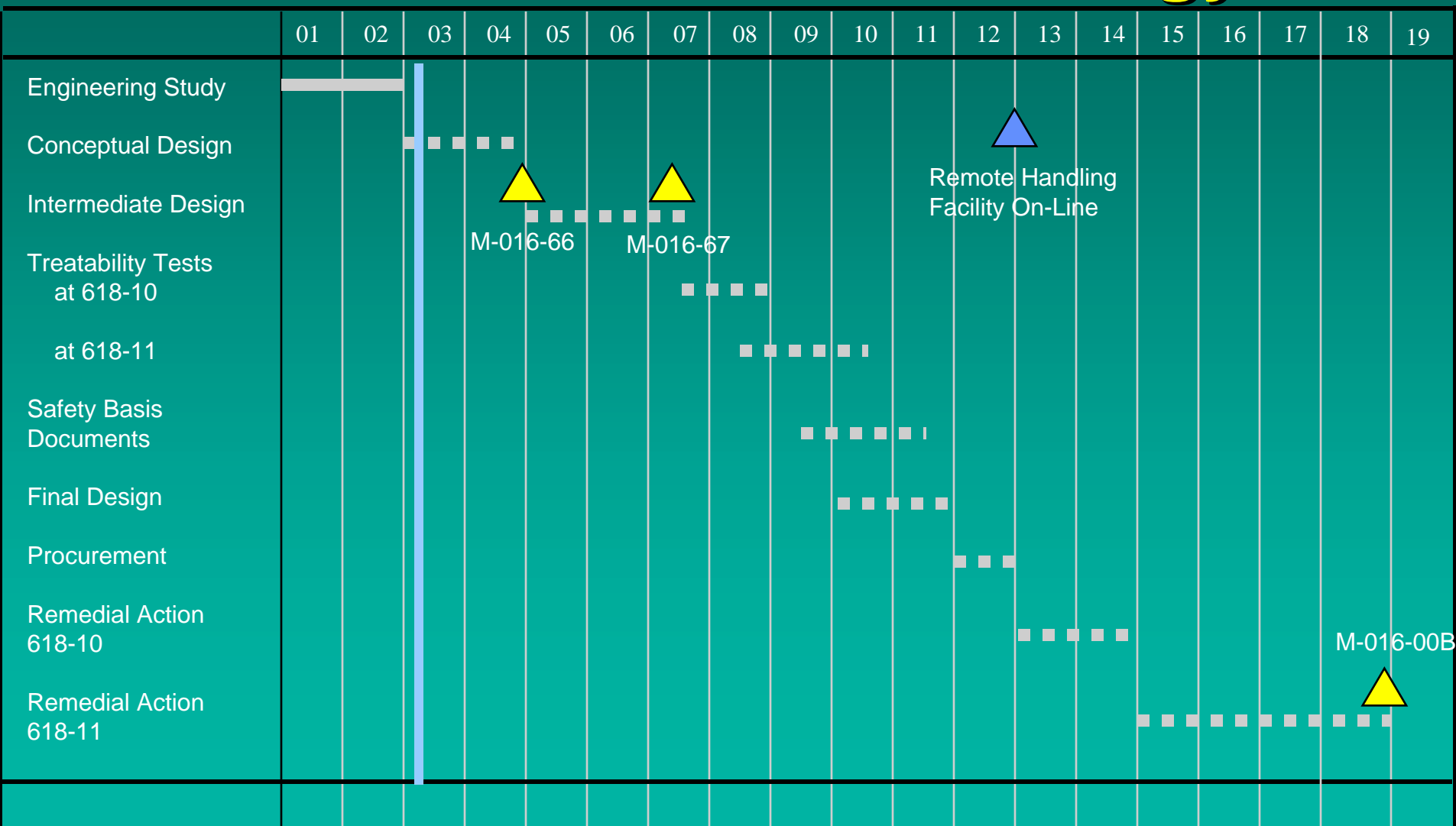
- Work has been completed or planned for the following:
  - FY 03
    - Basis for Interim Operations Safety Analysis Document
    - Update the 300 Area RDR/RAWP
    - Installation of 2 new monitoring wells at 618-10
    - Soil gas survey around the perimeter of 618-10
  - FY 04 - FY 05
    - Initiate remedial design based on Workshop outcome
    - Continue work of safety basis program
- Continued participation in Complex-wide TRU benchmarking calls
- Continued groundwater monitoring around both burial grounds

# Outyear Workscope and Schedule

- **FY 05-07**
  - INTERMEDIATE DESIGN
- **FY 07-10**
  - TREATABILITY TESTS
- **FY 10-11**
  - FINAL DESIGN
- **FY 12**
  - PROCUREMENT
- **FY 13-15**
  - 618-10 REMEDIAL ACTION COMPLETED
- **FY 15-18**
  - 618-11 REMEDIATION ACTION COMPLETED



# Baseline Remediation Strategy



# Current Milestones

- **M-016-66 (9/30/2004) Initiate intermediate design and authorization safety analysis for remedial actions at the 618-10 and 618-11 burial grounds.**
- **M-016-67 (3/31/2007) Submit an intermediate design report, a remediation schedule, and treatability investigation work plan for remedial actions at the 618-10 and 618-11 burial grounds (that will be consistent with WIPP RH-TRU and M-91 Waste Acceptance Criteria.**

## Current Milestones (continued)

- **M-16-00B (9/30/2018) Complete all interim 300 Area Remedial Actions (to include excavation and transport of waste from 618-10/11 burial grounds to appropriate approved facilities (WRAP for CH-TRU, M-91 for RH-TRU and ERDF for LLW), site closeout verification reports, backfill, and re-grading of waste sites).**

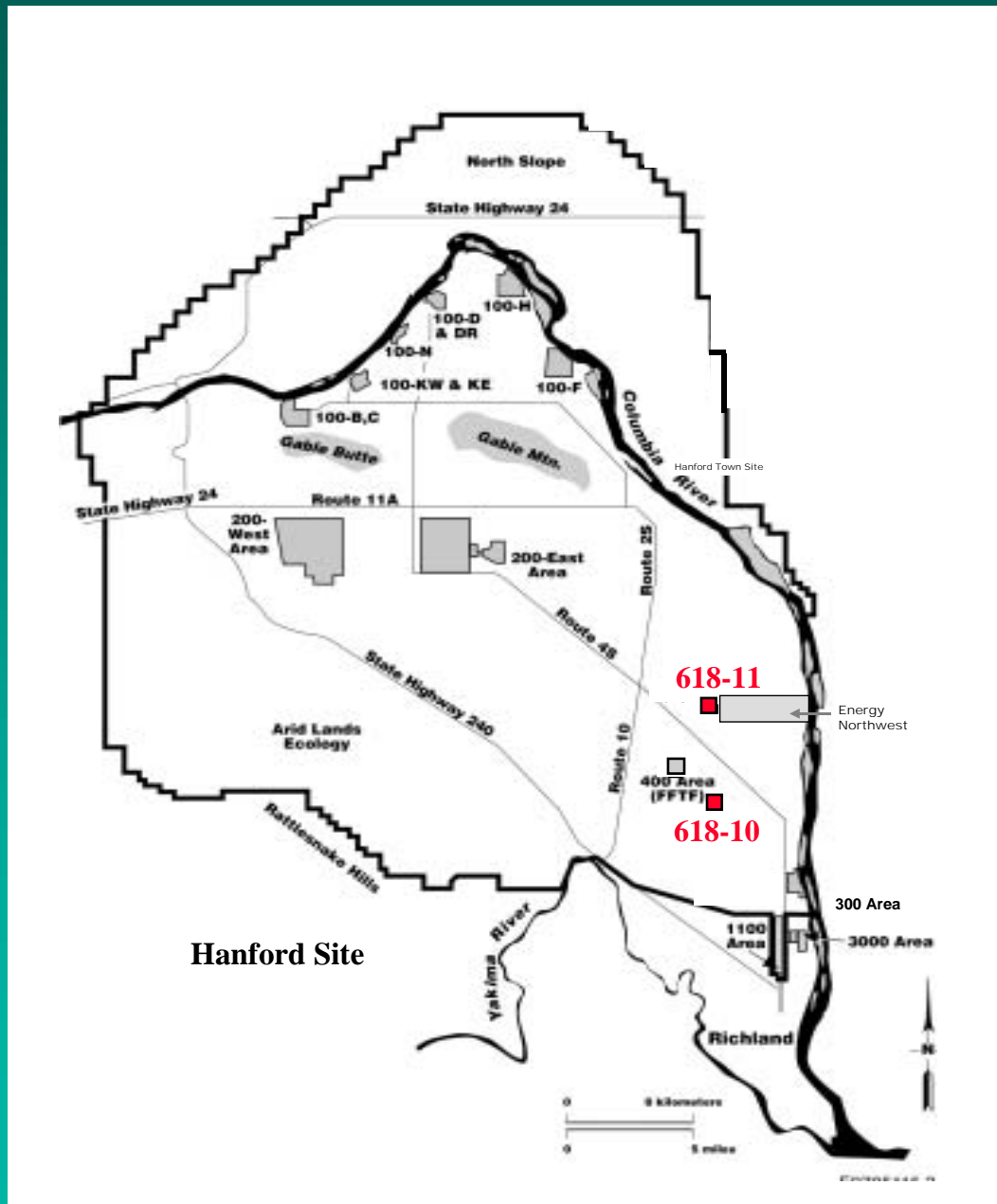
# Recommendations

- Host a workshop with other DOE Complex personnel
- Evaluate lessons learned from INEEL and Oak Ridge
- Integrate with 200 Area RH TRU retrieval (2012-2014)
- Re-evaluate path forward during the FY 04 planning

# Background Information

- **618-10 and 618-11 Burial Grounds:**
  - **Location**
  - **Description**
  - **Waste Volumes**
  - **Plot Plans**
  - **Disposal Units**
  - **Hazards**

## 618-10 and 618-11 Burial Grounds



# 618-10 and 618-11 Burial Grounds

- **618-10 Burial Ground**
  - Operated from 1954 – 1963
  - Approximately 5.2 acres in size
  - 2.3 miles west of the Columbia River
  - Estimated 130,000 cubic yards of waste with  
~11 cubic yards of Remote Handled (RH) TRU
  - Waste were disposed in 12 trenches and 94 pipe storage units

# Projected Waste Volumes

618-10 Burial Ground		Ft <sup>3</sup>	Yd <sup>3</sup>	m <sup>3</sup>
Contaminated Volume		3,447,916	127,000	97,640
Clean Volume		3,447,916	127,000	97,640
Contaminated Volume Breakdown				
Trenches (12)		3,444,198	127,560	97,470
VPU's (94)		2,974	110	84.2
Assumptions				
Trenches -	100% LLMW	3,444,198	127,560	97,470
VPU -	10% RHTRU	297.4	11	8.4
	90% LLMW	2676.6	99	75.7



## 618-10 and 618-11 Burial Grounds

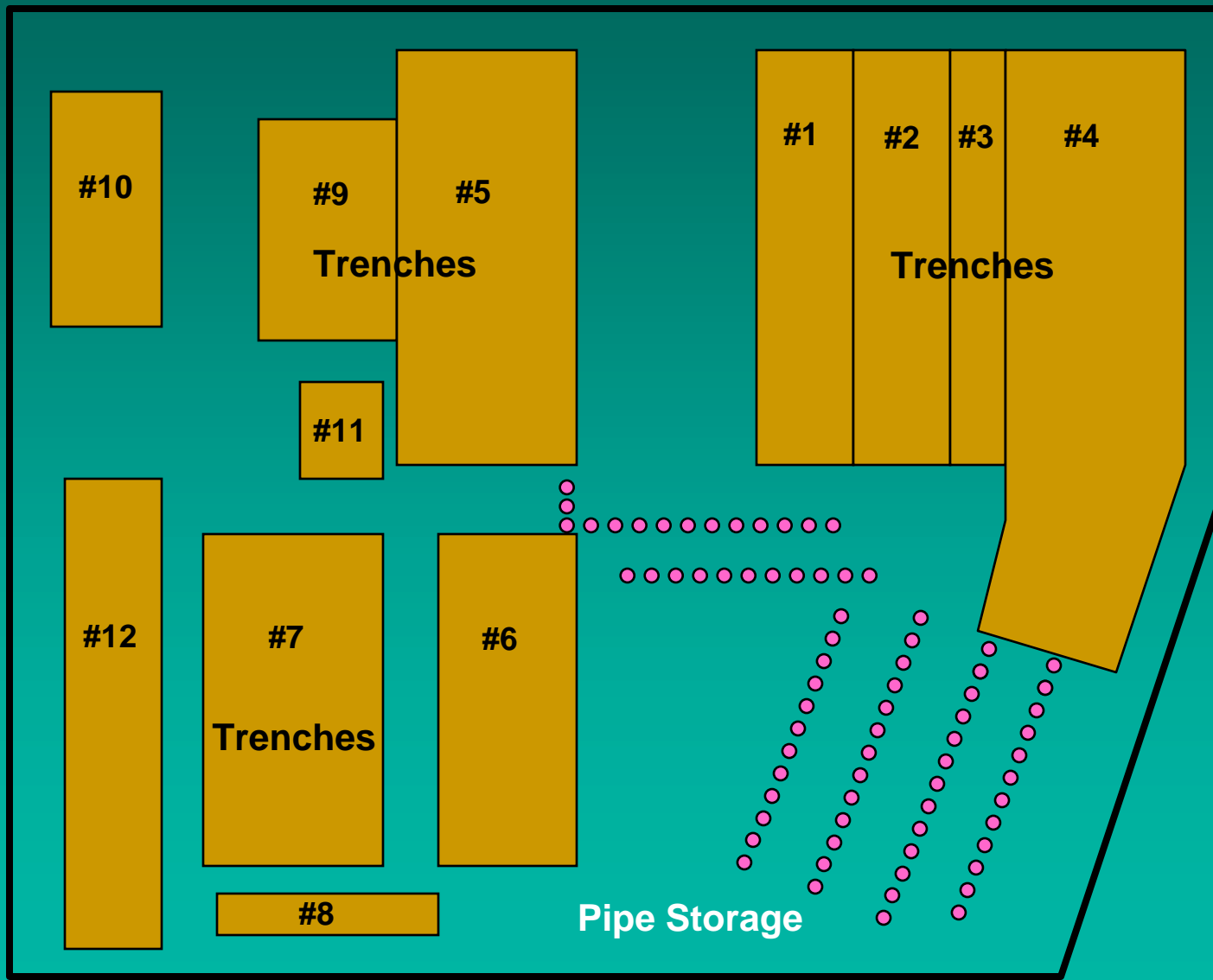


# 618-10 Plot Plan

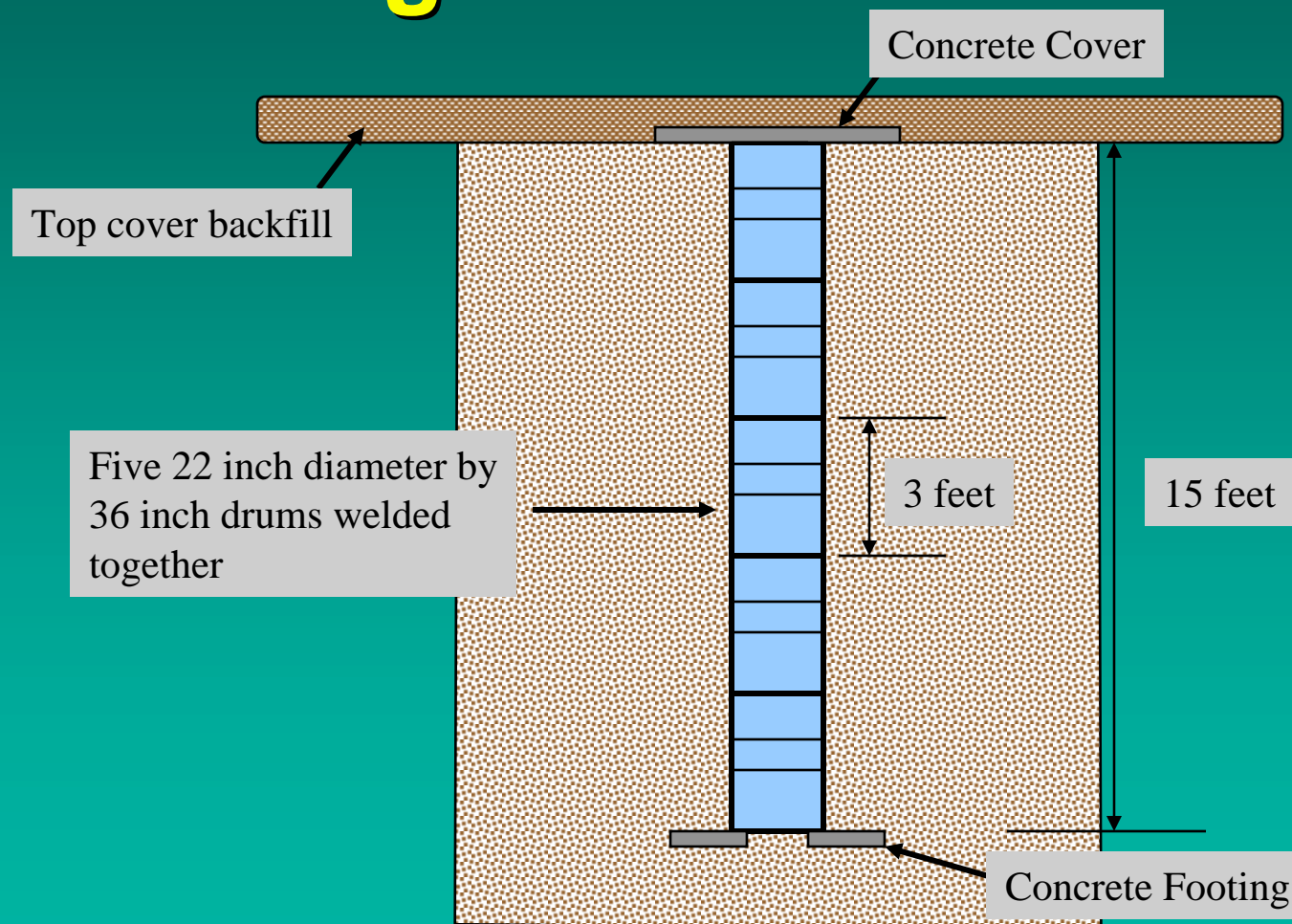
600 Feet



500 Feet



# Pipe Storage Units



# 618-10 and 618-11 Burial Grounds

- **618-11 Burial Ground**
  - Operated from 1962 – 1967
  - Approximately 8.6 acres in size
  - 3.5 miles west of the Columbia River
  - Estimated 134,000 cubic yards of waste with ~123 cubic yards of RH TRU and ~13,300 cubic yards of CH TRU
  - Waste were disposed in 3 trenches and 55 pipe storage units and 5 caissons

# Projected Waste Volumes

618-11 Burial Ground		Ft <sup>3</sup>	Yd <sup>3</sup>	m <sup>3</sup>
Contaminated Volume		3,607,500	133,600	102,160
Clean Volume		1,924,674	71,300	54,470
Contaminated Volume Breakdown				
Trenches (3)		3,603,354	133,460	101,975
VPU's (54)		1,708	63	48.3
Caissons (4)		1,608	60	45.5
Assumptions				
Trenches	10% CHTRU	360,335	13,346	10,200
	90% LLMW	3,243,018	120,110	91,780
VPU	100% RHTRU	1,708	63	48.3
Caissons	100% RHTRU	1,608	60	45.5



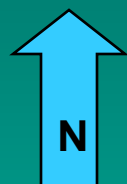
## Aerial View of the 618-11 Burial Ground in 1964



## Enlargement of Pipe Unit/Caisson Area in 1964



# 618-11 Plot Plan



Caissons



Pipe Storage



Trench 1

Trench 2

Trench 3

50  
Feet

900 Feet



*618-10 and 618-11 Burial Grounds*

# Dumping Waste in a 200 Area Burial Ground Trench



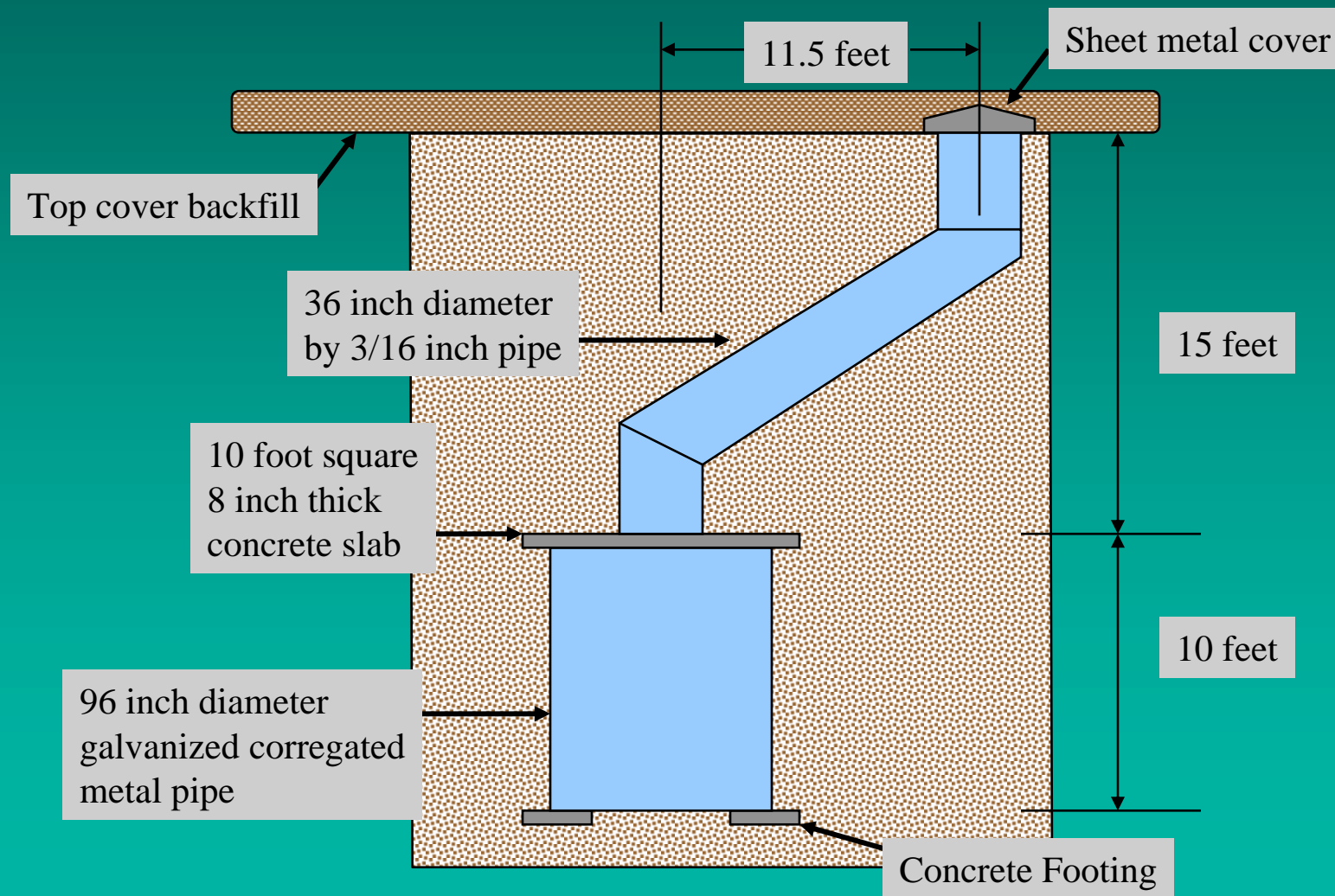
## 325-A Cask-Hauling Truck in Dump Position



# Waste Disposed to a 200 Area Caisson



# 618-11 Caissons





## 618-10 and 618-11 Burial Grounds

### Hanford's 618-11 Contaminated Waste Burial Ground Near the Energy Northwest Complex



### Typical Layout 618-10/11 Vertical Pipe Units, Caissons, and Trenches

#### Vertical Pipe Units

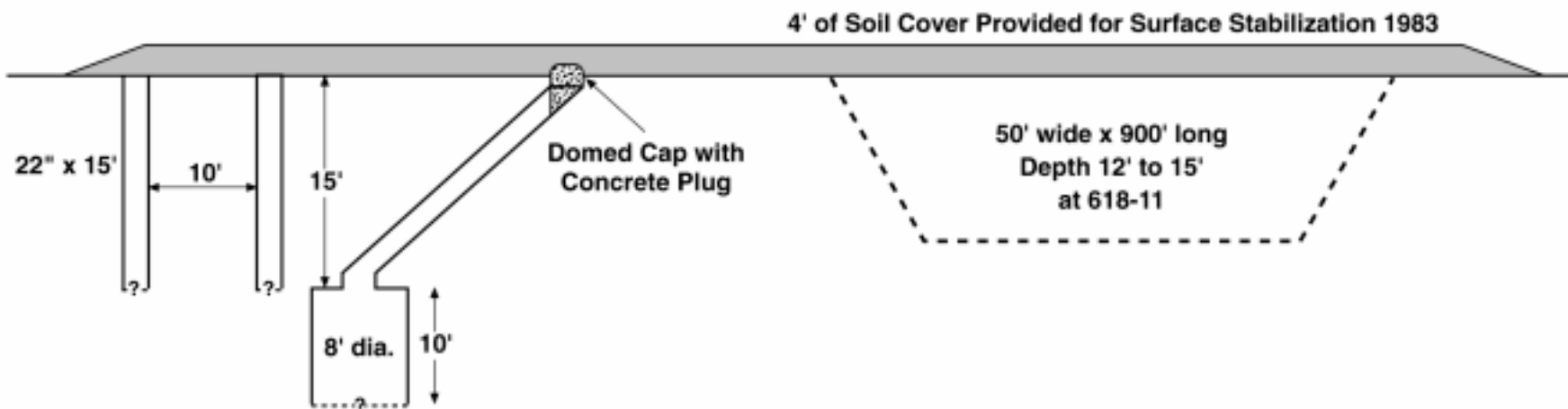
618-10 (94 units)  
618-11 (54 units)

#### Caisson

618-10 (0 units)  
618-11 (4 units)

#### Trench

618-10 (12 units)  
618-11 (3 units)



#### Inventories

- Vertical pipe units: Segments of irradiated fuel elements in "cans," other high activity wastes
- Caissons: Cardboard cartons and metal cans of high activity waste
- Trenches: Mostly LLW, possible some drag off burial (concrete boxes) high activity wastes

# 618-10 and 618-11 Burial Grounds

- **Radiological Hazards**
  - Cesium, strontium
  - Plutonium, americium, neptunium
- **Other Hazards**
  - Beryllium
  - Uranium and zirconium metals
  - Sodium-potassium metals
- **Limited records were kept and some of the records have been destroyed**
- **While the general practice was to place the higher activity waste in the pipe storage or caissons RH TRU is likely to exist within the trenches**

## **618-10 Cold Test Facility**

**(otherwise known as the Hanford Geotechnical Engineering and Development Facility or 600-276)**

- **Located just east of the 618-10 burial ground on approximately 10 acres**
- **Constructed during the 1980's**
- **Used to perform “cold test” demonstrations of geotechnical engineering prototype systems for insitu isolation and stabilization of waste disposal structures**



## 618-10 Cold Test Facility (cont.)

- Mock up burial trenches, caissons, vertical pipe units, tile fields, waste transfer lines, storage tanks, and timber cribs were installed
- At least one set of caissons including one 8 foot diameter caisson with an angled chute, two vertical pipe units, and a 14 inch diameter well casing storage unit are still in place. Some contain simulated waste.

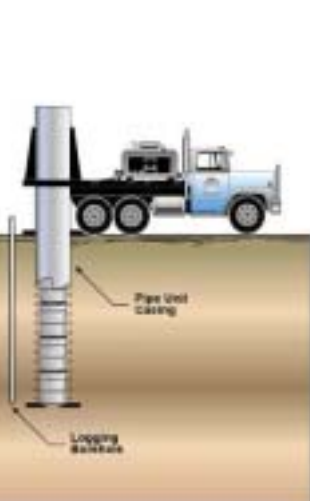
## 618-10 and 618-11 Burial Grounds



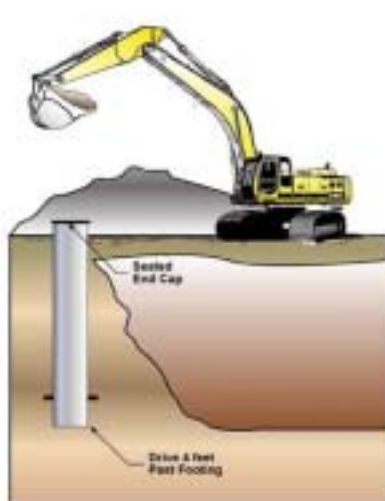
# Issues Requiring Resolution

- **Regulatory**
  - WIPP RH TRU acceptance criteria are pending
- **Technical**
  - The tritium plume and the associated risk require continued monitoring and assessment
  - Need to decide on baseline path for VPU's and caissons
    - A) Place a casing around them, excavate, ship to M-91 for characterization, repackage as needed, then shipment to WIPP
    - B) Retrieve discrete packages by remote means; needs technology development

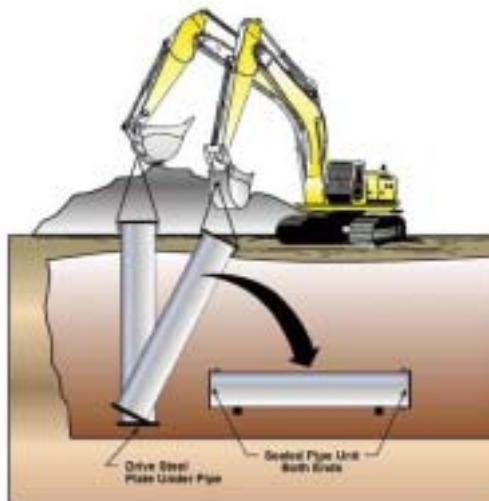
### Artist Concept for Remediation of 618-10 Burial Ground Vertical Pipe Units



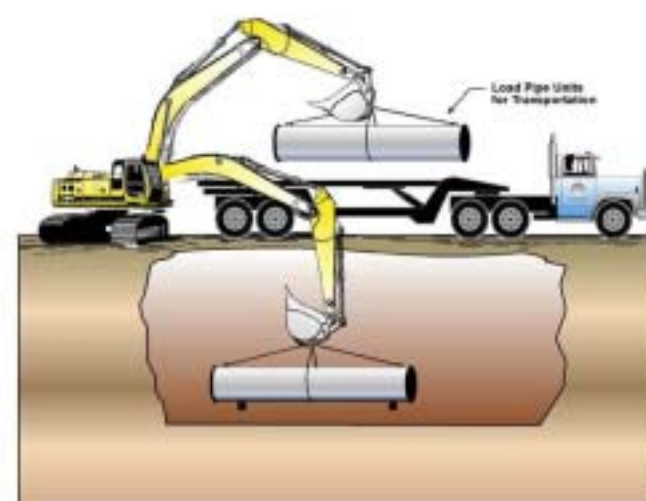
- 1 Install geophysical logging borehole and perform logging.
- 2 Place casing over pipe unit.



- 3 Excavate Pipe Unit
- 4 Seal Top End of Casing



- 5 Finish Excavation of Pipe Unit
- 6 Seal Bottom End of Casing (e.g. Drive end plate under pipe unit and weld to casing).
- 7 Lift and Layover onto side.



- 8 Remove Sealed Pipe Unit and Load on Transportation Device (Truck or Rail)



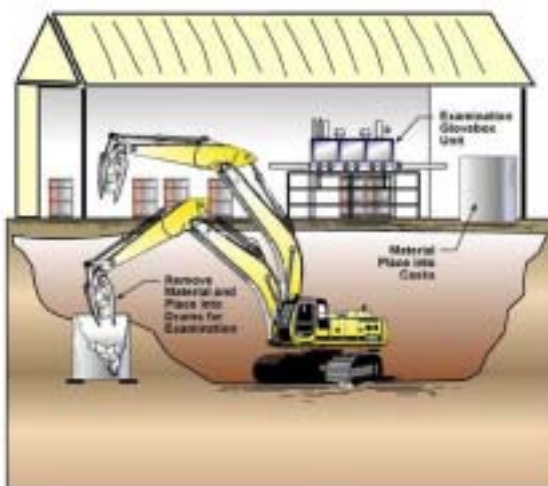
### Artist Concept for Remediation of 618-11 Burial Ground Caisson Units



- 1 Install geophysical logging borehole and perform logging.
- 2 Excavate Caisson Unit.



- 3 Remove Angle Chute from Caisson.
- 4 Install Temporary Cap on Caisson.



- 5 Remove Caisson Contents.
- 6 Process and Inspect Contents.
- 7 Package Contents into Casks for Transportation.



- 8 Load Sealed Casks on Transportation Device (Truck or Rail)

# Issues Requiring Resolution

- **Technical (continued)**
  - Alternatives for characterization and remediation need to be developed
    - Retrieval will be extremely difficult and will require the development of numerous remote handling and containment systems
    - Staging/Transportation - Facilities for staging the waste prior to shipment and containers/casks for shipment need to be evaluated
  - Storage and treatment facilities need to be available for the waste that can not go to ERDF
  - Storage/treatment needs to be coordinated with 200 Area RH TRU

# Issues Requiring Resolution

- **Technical (continued)**
  - Waste handling process will be needed by 2013 when the RH TRU facility is complete.
  - Potential criticality issues may exist during remedial actions with both burial grounds

# Issues Requiring Resolution

- **Logistics**
  - 618-11 is located adjacent to Energy Northwest
    - Remediation may represent a significant risk to their workers and a liability to Energy Northwest
  - 618-10 and 618-11 are located south of the Wye Barricade
    - Waste transportation needs to be evaluated relative to types and numbers of shipments, potential for road closures, and use of rail system
  - WIPP scheduling for RH TRU needs to be examined as a potential driver for remediation of the burial grounds
    - WIPP will conclude normal operations for legacy TRU waste by 2015 (per WIPP acceleration PMP)
    - WIPP will stay open (on a demand basis) beyond 2015



# Issues Requiring Resolution

- **Timing and resources**
  - **Revision of estimated costs**
    - Cost estimate for 618-10 is a parametric estimate based on a non-TRU standard solid waste burial ground - \$35M
    - While 618-11 estimate attempted to provide a more realistic estimate, it did not consider initiating the remediation with Energy Northwest still operating - \$340M
    - Overall disposal costs are strongly dependent upon the RH-TRU WIPP WAC (assumed to be approved by 2005)
    - Limited waste inventory records (both hazardous and radioactive) exist, therefore inventory estimates and overall project costs have large uncertainties

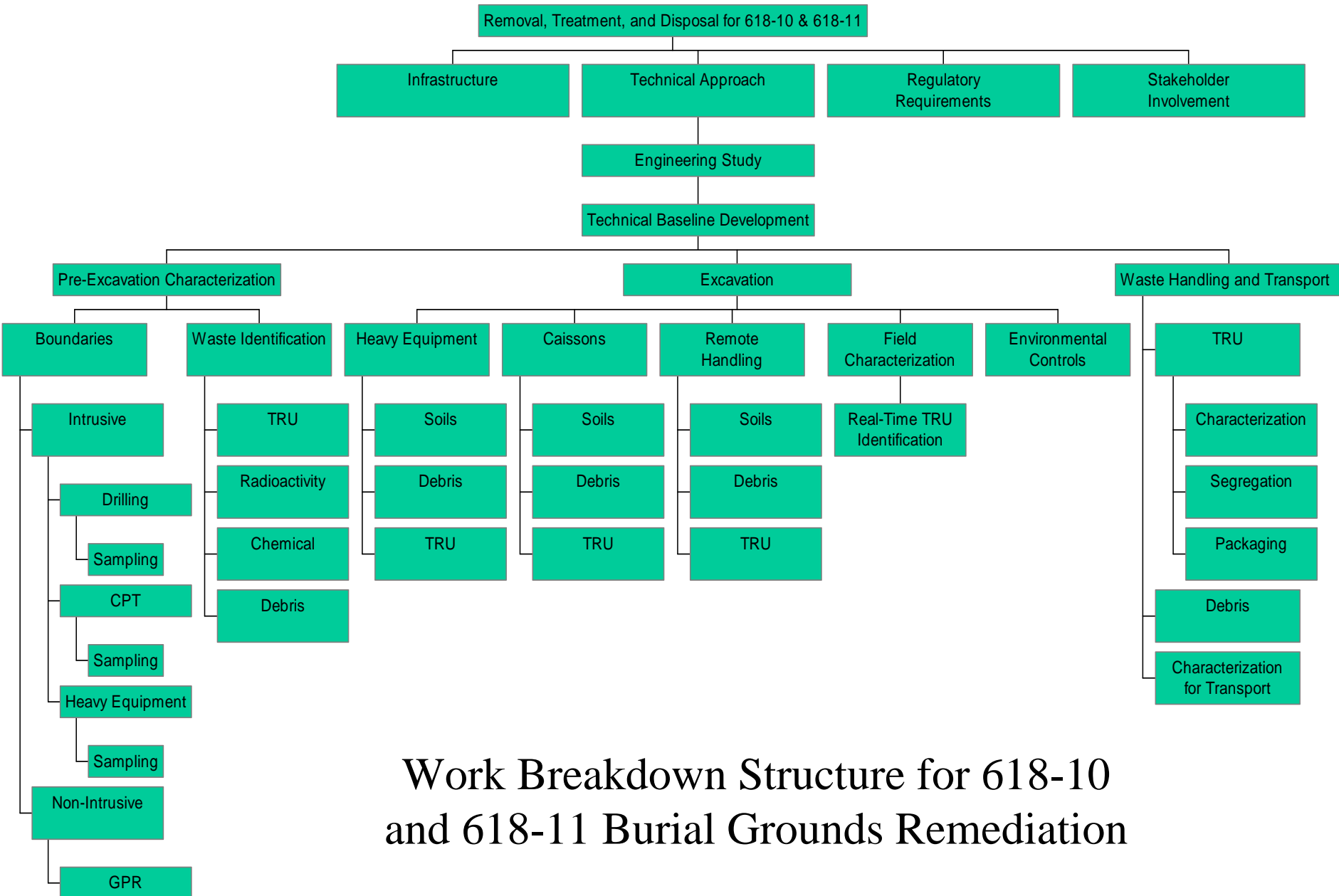
# Issues Requiring Resolution

- **Timing and resources (continued)**
  - **Priority relative to other activities**
    - Once these burial ground remedial actions are initiated they should be completed
    - The funding required for remediation could be a significant impact to other Hanford Site activities

# Identification of Technologies

## Technology Alternatives Baseline Report of the 618-10 and 618-11 Burial Grounds, 300-FF-2 Operable Unit

- Uses Work Breakdown Structure to identify major tasks
- Matches tasks with technologies
- Identifies technology gaps and matches them with specific tasks



## Work Breakdown Structure for 618-10 and 618-11 Burial Grounds Remediation

# Technology Baseline

- Pre-excavation characterization
  - Identify boundaries
  - Identify wastes
- Excavation
  - Includes use of heavy equipment, remote handling, environmental controls
- Waste handling and Transport
  - Methods for characterization, segregation, packaging

# Possible Field Activities

- **Nonintrusive work**
  - Initiate more detailed surface geophysics surveys to expand delineation of burial ground trenches, VPUs, and caisson locations.
  
- **Remedial Design Work**
  - Borings next to the pipe units or caissons for downhole radiological dose readings
  - Camera and radiological surveys inside the VPUs or caissons
  - Might include excavation to uncover the tops of the VPU or caisson

# Possible Field Activities (cont'd)

- **Treatability Test Plan**
  - **Develop processes for excavation, stabilization, retrieval and handling, characterization, packaging and transportation, safety, storage, treatment, and final disposal**
    - **Use the Cold Test Facility adjacent to 618-10**
    - **Begin with a Vertical Pipe Unit at 618-10**
    - **Proceed to work at a caisson at 618-11**
    - **Contingent on EM-50 TD Project**



# Potential Near-Term Remedial Actions

- **Begin remediating 618-10 trenches**
  - Assumed to be all LLMW going to ERDF
  - Begin with “oil trench”
    - potential for waste management problems
- **Will need to have contingency plans in place to deal with TRU – for concreted drums in the trenches**
  - send to WRAP or CWC for temporary storage

# Summary

- There are a lot of technical, logistical, regulatory, and resource challenges to resolve.
- All of them can be addressed.
- That is why we are all here this week.